

Near-Earth Object Exploration and Marco Polo-R

A major goal for NASA's human spaceflight program is to send astronauts to near-Earth asteroids (NEAs) in the coming decades. Missions to NEAs would undoubtedly provide a great deal of technical and engineering data on spacecraft operations for future human space exploration while conducting in-depth scientific examinations of these primitive objects. However, prior to sending human explorers to NEAs, robotic investigations of these bodies would be required in order to maximize operational efficiency and reduce mission risk. These precursor missions to NEAs would fill crucial strategic knowledge gaps concerning their physical characteristics that are relevant for human exploration of these relatively unknown destinations.

Therefore robotic investigations of NEAs, such as ESA's Marco Polo-R sample return mission to 2008 EV5, would allow NASA and its international partners to gain critical operational experience in performing complex tasks (*e.g.*, close proximity operations, surface sample collection, *etc.*) under microgravity conditions at or near the surface of a potential human destination. This would provide an important synergy between the worldwide Science and Exploration communities, which will be crucial for development of future international deep space exploration architectures and has potential benefits for future exploration of other destinations beyond low-Earth orbit.